



exploration

...the essence of the human spirit.

Frank Borman
APOLLO ASTRONAUT



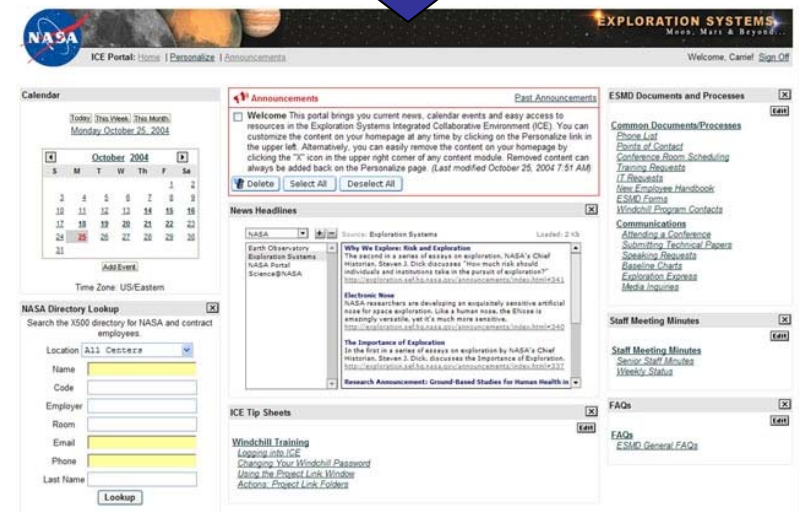


Integrated Collaborative Environment

ICE is web-centric environment which will be used by industry, academia and government for: sharing, collaborating, integrating, accessing and controlling management information and product data defining all of the products which are part of Exploration Systems.



- Single source access to all ESMD data
- Integrated programmatics
- Accessibility from anywhere in the world



ICE is the authoritative source for all program deliverables

Why ICE?

ICE Reduces ESMD Program/Project Performance Risk By:

- Providing better program visibility, control and decisions throughout the program life cycle
- Enabling assessment and review of ESMD Program/Project components throughout the development life cycle

ICE Reduces ESMD Program/Project Cost By:

- Reduction in tools and processes
- Reduction in travel costs and paper based communication costs

ICE Improves Mission Assurance and Mission Safety:

- Ensures availability of all data related to ESMD products during ESMD operations – key lessons learned from Space Shuttle & Station





ICE Major Functions

Product Life Cycle Management w/ Integration Bus – *enables access to all sources of authoritative program data resident in multiple data sources.*

Programmatic Management – *Management of all programmatic data (cost, schedule, performance, risk) as well as providing a single view into information allowing users to develop earned value metrics and risk mitigation plans.*

Project Collaboration – *Application for sharing and teaming among all ICE constituents that provides access control, discussion forums, resource management and project reporting.*

Process Automation (Workflow) – *automated process management ensuring consistency across programs.*

Visualization – *web-centric capability providing 2D and 3D visual collaboration, mock-up, prototyping, review and study as part of the product development process.*



ICE Applications

Portal

Windchill

Active Risk Manager

Cradle

Primavera

ICE Portal

<https://ice.exploration.nasa.gov>

The **ICE Portal** is a single source login for all ICE applications and houses ESMD related information such as:

- Ice Application Links
- ICE Training Documentation
- ESMD Calendar of Events
- Windchill Project Owner List
- ESMD News
- ESMD Communications Toolkit
- Etc.

The **ICE Portal** can be personalized.





ICE Windchill Features

Electronic Registration & Approval Process

User Information Management

- Single location for all activities and tasks from any project
- Personal Notebook to maintain documentation and links throughout any projects

Project Collaboration Space

- Manage project team and access control
- Manage access control settings at folder and document level
- Share documents across projects or products
- Upload multiple files through drag-and-drop
- Check-Out and Check-In features to maintain accurate document history
- Route documents for notifications, reviews, approvals, etc.
- Discussion forums
- View project-specific reports
- Create or use standard roles (each role will have a different set of permissions)
- Invite multiple users at once
- Replace user and all associated tasks

Coordinate Meetings

Project Plan

- Import/ Export Microsoft Project 2000 Plan
- Edit plan in MSProject 2000 and append changes to Windchill

Search

- Search across all projects, products and libraries or in a specific context
- Full-text or document name search

Visualization and Markup

- View 2-D and 3-D information using built-in self loading, lightweight viewer
- Create viewables on check-in
- Windchill ProductView full visualization client available

CAD Management

- Download CAD Publishing Manager Plug-In
- Exchange CAD Data as packages

Configuration Management

- Formal control over a product lifecycle
- Highly controlled designs with release management
- Product structure and configuration management
- Structured revision control

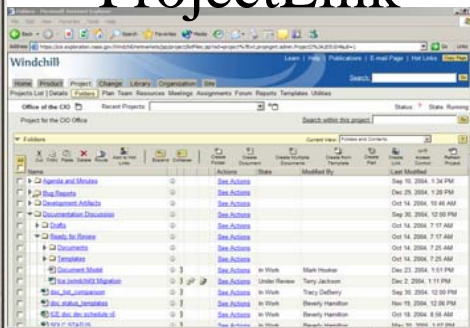


Windchill, ProjectLink, Products, Libraries? What are all these tools and how do I use them?

Windchill is a COTS tool ESMD has purchased as part of the ICE suite of tools.

- Components of Windchill:
 - ProjectLink
 - PDMLink or Product
 - Library

ProjectLink

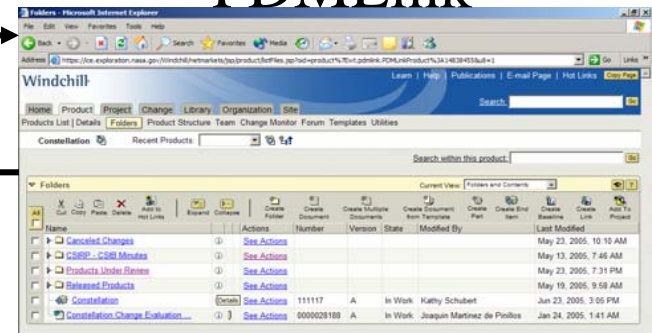


Teams come together to create documents

Once document ready to be put under CM, Project Team shares document to Product Repository then uses CMII process to release document

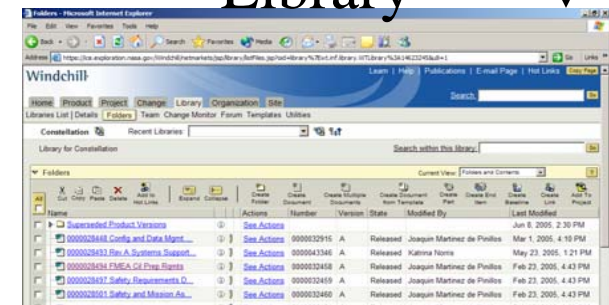
When a document is revised it is shared back to ProjectLink so a project team can come together to work on the generation of the document.

PDMLink



Once documents released by CM process they need to be shared from product repository to Library for wider distribution

Library





Windchill for CLV

5 Windchill projects set up for CLV; dozens given access

My Projects									
Current View: Projects of My Organization									
Name	Actions	Owner	Host	Category	Phase	State	Status	Done	Last Modified
CLV - First Stage	See Actions	Rick Burt	Exploration_Systems	General	Kickoff	Running		0%	Aug 25, 2005, 5:13 PM
CLV - Upper Stage	See Actions	Daniel Davis	Exploration_Systems	General	Kickoff	Running		0%	Oct 13, 2005, 4:51 PM
CLV - Upper Stage Engine	See Actions	Michael Kynard	Exploration_Systems	General	Kickoff	Running		0%	Oct 20, 2005, 9:15 PM
CLV - Vehicle Integration	See Actions	James Reuter	Exploration_Systems	General	Kickoff	Running		0%	Oct 3, 2005, 6:05 PM
CLV Project Management	See Actions	Steve Cook	Exploration_Systems	General	Kickoff	Running		0%	Sep 6, 2005, 2:54 PM

Folders									
Current View: Folders and Contents									
Name	Actions	State	Modified By	Last Modified					
▼ (01) Project Management	See Actions			Oct 24, 2005, 8:17 PM					
▶ A) Site Map	See Actions			Oct 12, 2005, 6:23 PM					
▼ B) Documents	See Actions			Oct 12, 2005, 6:23 PM					
1) Contractor-Produced	See Actions			Oct 12, 2005, 6:23 PM					
▼ 2) Program-Project	See Actions			Oct 12, 2005, 6:23 PM					
*Master List	See Actions			Oct 12, 2005, 6:23 PM					
*Note- Released Docs in Library tab	See Actions			Oct 12, 2005, 6:23 PM					
Draft	See Actions			Oct 12, 2005, 6:23 PM					
Internal	See Actions			Oct 12, 2005, 6:23 PM					
NASA-only	See Actions			Oct 12, 2005, 6:23 PM					
3) Technical Papers	See Actions			Oct 12, 2005, 6:23 PM					
C) Program Project Reviews	See Actions			Oct 12, 2005, 6:23 PM					
▼ D) Meetings, Presentations	See Actions			Oct 12, 2005, 6:23 PM					
1) Contractor	See Actions			Oct 12, 2005, 6:23 PM					
2) External to NASA	See Actions			Oct 12, 2005, 6:23 PM					
3) Internal to NASA	See Actions			Oct 12, 2005, 6:23 PM					
4) Ad Hoc	See Actions			Oct 12, 2005, 6:23 PM					
▼ E) Program-Project Performance	See Actions			Oct 12, 2005, 6:23 PM					
1) Cost	See Actions			Oct 12, 2005, 6:23 PM					
2) Schedule	See Actions			Oct 12, 2005, 6:23 PM					
3) Status	See Actions			Oct 12, 2005, 6:23 PM					
F) Archive	See Actions			Oct 12, 2005, 6:23 PM					
G) Transient Folder	See Actions			Oct 21, 2005, 8:39 PM					

Standard folder structure established for all CLV Windchill projects; currently being updated



exploration

Windchill for CLV

Current View: Folders and Contents									
Name	Actions	Number	Version	State	Modified By	Last Modified			
CDM	See Actions					Sep 30, 2005, 6:37 PM			
AI Site Map	See Actions					Sep 30, 2005, 6:39 PM			
BJ Meetings	See Actions					Sep 30, 2005, 6:39 PM			
ELO Office 10042005	See Actions					Oct 7, 2005, 4:12 PM			
01-ESAS Condensed-Cook	See Actions	0000067674	A	In Work	(b)(4)	Oct 7, 2005, 6:57 PM			
02-Upper Stage Engine-Kymard	See Actions	0000067634	A	In Work	(b)(4)	Oct 7, 2005, 6:10 PM			
03-Mandate-Dumbacher	See Actions	0000067636	A	In Work	(b)(4)	Oct 7, 2005, 6:11 PM			
04-Chief Engineer-Snoody	See Actions	0000067637	A	In Work	(b)(4)	Oct 7, 2005, 6:12 PM			
05-VIA SRR-Reuter	See Actions	0000067639	A	In Work	(b)(4)	Oct 7, 2005, 6:13 PM			
06-Advanced Planning-Sumail	See Actions	0000067640	A	In Work	(b)(4)	Oct 7, 2005, 6:14 PM			
07-Project Integration-Morris	See Actions	0000067641	A	In Work	(b)(4)	Oct 7, 2005, 6:14 PM			
08-Procurement-Posey	See Actions	0000067642	A	In Work	(b)(4)	Oct 7, 2005, 6:15 PM			
09-S&MA-Tesney	See Actions	0000067643	A	In Work	(b)(4)	Oct 7, 2005, 6:16 PM			
10-Legal-Frees	See Actions	0000067644	A	In Work	(b)(4)	Oct 7, 2005, 6:16 PM			
11-PP&C-Pollard	See Actions	0000067645	A	In Work	(b)(4)	Oct 7, 2005, 6:17 PM			
12-First Stage-Williams	See Actions	0000067647	A	In Work	(b)(4)	Oct 7, 2005, 6:17 PM			
13-Upper Stage-Davis	See Actions	0000067648	A	In Work	(b)(4)	Oct 7, 2005, 6:18 PM			
PCB 001 05052005	See Actions					Oct 3, 2005, 8:36 PM			
CI Approved Documents	See Actions					Sep 30, 2005, 6:41 PM			
CLV-ICD	See Actions	0000064897	A	In Work	(b)(4)	Oct 3, 2005, 9:25 PM			
MSFC-ESAS-Refout_050205-1	See Actions	0000064898	A	In Work	(b)(4)	Oct 3, 2005, 8:38 PM			
MSFC-ESAS-Refout_050205-2	See Actions	0000064899	A	In Work	(b)(4)	Oct 3, 2005, 8:38 PM			
01 Reference Documents	See Actions					Sep 30, 2005, 6:41 PM			
ARMs, JOECs, and Procurement Au...	See Actions	0000071649	A	In Work	(b)(4)	Oct 19, 2005, 10:57 PM			
Fee COTR Course November 2005 (...)	See Actions	0000071650	A	In Work	(b)(4)	Oct 19, 2005, 10:57 PM			
EL Directiva	See Actions					Sep 30, 2005, 6:42 PM			

CLV Library set up for sharing documents; dozens given access

Information Management support team established, including backups



CM-DM Process - Application of tools

Slide under construction



Active Risk Manager (ARM)

ARM Capabilities:

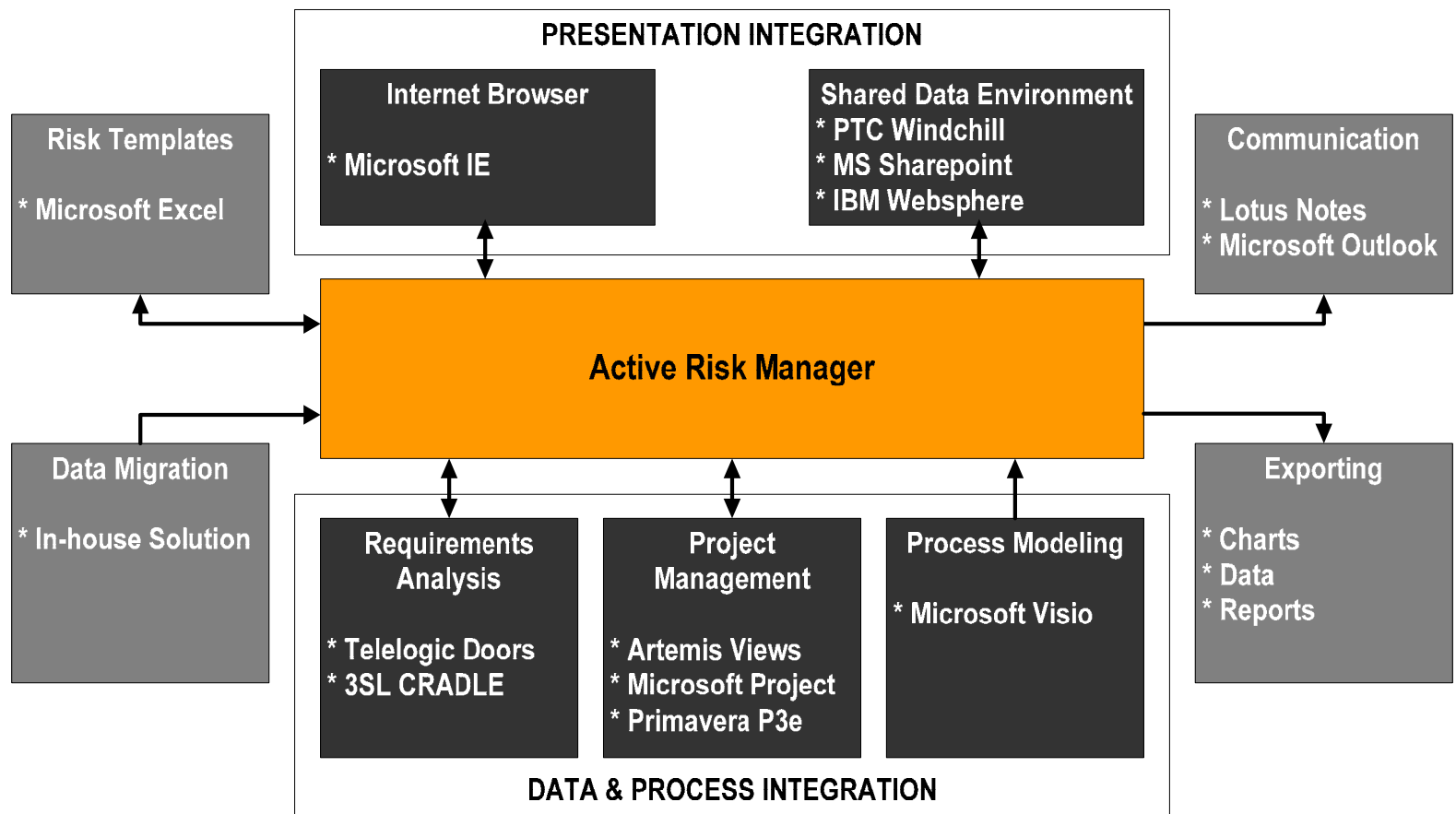
- **Supports NASA CRM process**
- **Data Capture**
 - Traceability for each risk element
 - Summary & Detail Risks
 - Label Configuration
 - Fast Risk Entry
- **Reporting & Notifications**
 - Inbuilt Email notification
 - Automatic risk alerts
 - Waterfall Charts
 - Risk Rollup capability
 - Risk Register
 - Risk distribution reports
 - Traffic light risk warnings
- **Analysis & Management**
 - Inbuilt Monte Carlo analysis
 - Schedule & Program analysis
 - Unlimited mitigation actions
 - Risk resource management
- **Security / System Control**
 - Multi level business/project security
 - Risk level security
 - Integration with Primavera v4.0, MS Project 2003 Server and MS Project 2003
 - Windows 2003 Server Support
- **MAC Users**
 - Virtual PC



ARM Integrations

Dovetail applications to enable effective risk management

- We continue to integrate applications as per our customer requirements





ARM Screen - Risk Review

ARM Risk Review Area

http://testing.exploration.nasa.gov/ Active Risk Manager Training/ESMD Microsoft Internet Explorer

ACTIVE RISK MANAGER

RISK REVIEW

File Edit New Review View Link Analysis Reports Tools Help -- Filters OFF --

Requirements ESMD Activities ID Risk Title Risk Owner Status Risk Level

Requirements	ESMD	Activities	ID	Risk Title	Risk Owner	Status	Risk Level
ESMD	ESMD	8	Risk 1	USER1 CDL	Candidate	NIL	
Acquisition & Mission Support Requirement	Acquisition & Mission Support	9	Risk 2	USER1 CDL	Candidate	NIL	
Exploration Systems Contracting Division	Exploration Systems Contracting Division	11	Risk 3	USER1 CDL	Candidate	NIL	
Requirements Division	Requirements Division	10	Risk 4	USER1 CDL	Candidate	NIL	
Simulation Based Acquisition	Exploration Systems Research Techno						
Human System Research & Technology	Prometheus Nuclear Systems & Techn						
Exploration Systems Research Technology	Constellation Systems						
Prometheus Nuclear Systems & Technology	1.0 Tractor Beam						
JPL Prometheus	1.1 Project Reserves						
Constellation Systems	1.2 Project Management						
	1.2.1 Resource Control						
	1.2.2 Reporting						
	1.2.3 Schedule Development & T						
	1.2.4 Project Complete						
	1.3 System Management						
	1.3.1 Requirements Management						
	1.3.2 Interface Control						
	1.3.3 Verification and Validation						
	1.3.4 Technical Margins						
	1.3.5 Project Complete						
	1.4 Safety and Mission Assurance						
	1.4.1 System Safety						
	1.4.2 Risk Management						
	1.4.3 Configuration Management						
	1.4.4 Reliability						
	1.4.5 Project Complete						
	1.5 Command and Control Technol						
	1.5.1 Concept Definition						
	1.5.2 CR Review Package Ready						
	1.5.3 System Design - Year 1						
	1.5.4 System Design - Year 2						
	1.5.5 PDR Package Ready						
	1.5.6 Hardware - LockheedMarlin						
	1.5.7 Control Software-Flieby-Kr						
	1.5.8 Integrated Technology Demo						
	1.6 Flight Test						

Review Risks for selected node

Internet

Requirements CRADLE

Risks Each Link Contains Risk Details

Work Breakdown Structure (WBS) PRIMAVERA



RMP ... Application of Tools

- *The objective of the CLV Risk Management (RM) process to: Identify, Analyze, Measure, Plan, Track and Control Program/Project risks that are Credible, Defensible and Integral to day-to-day Activities & Decisions*
 - CLV Risk Management Officer (RMO) – Vyga Kulpa (544-1383)
- *Current and Future Activities:*
 - CLV Project Risk Management Plan - Element RM Plans in Appendices (Draft Oct 28th)
 - CLV Risk Management Panel - works CLV integrated risks and pre-Board to CLV PCB for risks
 - Active Risk Manager (ARM) - ESMD wide risk tool, WBS based folders for Programs, Projects and Elements (contact Vyga Kulpa)
 - Risk Capture Tool - interim tool to capture risk while ARM tool is being (b)(4)
 - CLV risk management training - includes CLV RM process and ARM training (1st Class Nov 21st)
 - Root Source Analysis (RoSA) - a systematic process and tool to identify (b)(4)
 - Risk Based Acquisition Management (RBAM) CLV procurement activities (contact Vyga Kulpa)
 - Risk Management Officer (RMO) Tag-Ups (Tuesdays at 3:00 p.m.)

Cradle

Systems Engineering

There are many tools in the Cradle environment All are grouped into three Cradle components:

- **Cradle Toolset**
- **Cradle WorkBench**
- **Microsoft Office®**

Cradle fully supports systems and software engineering processes with tools for:

- **Requirements management**
- **Performance assessment**
- **Systems analysis**
- **Metrics**
- **Architecture design**
- **Test and acceptance management**
- **System and subsystem design**
- **Project document generation (paper, word processing software or web) for ICDs, Requirements Docs, etc.**
- **Function allocation**

Note - ProE has been identified as the ED design tool





Cradle Workbench View

Cradle WorkBench - CRADLE Demonstration Project (13 unread alerts)

File Edit Item Style Admin Window Help

Form **Requirement - Complete** Navigation **Downwards**

Master Tree

- workBench
 - Data Display
 - Process
 - Database
 - Queries
 - Personal
 - User
 - Team
 - User Type
 - Project
 - Data Block - All
 - Definition - All
 - Diagram - Ess DFD**
 - Diagram - Ess eFF
 - Doc Section - All
 - Feature - All
 - Issue - All
 - PBS - All
 - PBS - Config Items
 - PBS - Product Opt
 - Reference - All
 - Requirements - All
 - Requirements - Le
 - Results - All
 - Risk - All
 - SBS - All
 - Specification - Ess
 - Specification - Imp
 - Stakeholder - All
 - Customer Req

Queries 1

Requirements - All

Identity	Version	Draft	Name
Previous...			
0		A	Stakeholder Rec
1		A	Customer Requir
1.1		A	Capacity
1.1.1		A	Flight Crew
1.1.2		A	Passengers
1.1.2.1		A	Passenger
1.1.2.2		A	Luggage
1.2		A	Operating Feat
1.2.1		A	Flight Path
1.2.1.1		A	Cruise Speed
1.2.1.2		A	Runway Length
1.2.2		A	Flight Schedule
1.3		A	Environment
1.3.1		A	Wind
1.3.2		A	Temperature

Queries 2

Diagram - Ess DFD

Identity	Name
Previous...	
0	CONTEXT DIAGRAM
Next...	

Items 1

1 (A)

Name: Customer Requirements

Identity: 1

Key:

Draft: A Version:

Owner: REQMAN

Item Status: AGREED

Classification: UNCLAS

Baseline:

Requirement Details:

The outline requirements for the aircraft are:

PICTURE

Acceptance Criteria:

Items 2

E DFD: 0 (01A)

Model: E Identity: 0

Subtype: DFD Name: CONTEXT DIA

Draft: A Version: 01

Owner: DEVMAN

Security: UN

Baseline:

Key:

Comment:

Group:

Description:

Check in System

Passenger Details

Fl

RW



SEMP ... Application of Tools

- *SEMP describes the Systems Engineering organization and management processes that will be applied to the CLV Project to assure success through complete and efficient technical integration.*
- *Roles and Responsibilities will be defined for all major SEI functions*
- *Processes*
 - Use of Technical Panels and Integration Groups to perform informal technical integration between elements and between CLV SEI and level II SEI
 - Use of Vehicle Integration Control Board to perform formal technical integration between the elements and between CLV SEI and level II SEI.
 - Use of work packages to formally manage and integrate the SEI work between CLV VI and MSFC Engineering, and TTAs between CLV VI and the other centers.



Windchill v Cradle Features

Windchill

- *Electronic Registration & Approval Process*
- *User Information Management*
 - *Single location for all activities and tasks from any project*
 - *Personal Notebook to maintain documentation and links throughout any projects*
- *Project Collaboration Space*
 - *Share documents across projects or products*
 - *Check-Out and Check-In features to maintain accurate document history*
 - *Route documents for notifications, reviews, approvals, etc.*
- *Coordinate Meetings*
- *Project Planning - MS Project*
- *Configuration Management*
 - *Highly controlled designs with release management*
 - *Structured revision control*

Cradle

- *Requirements management*
- *Systems analysis*
- *Architecture design*
- *System and subsystem design*
- *Function allocation*
- *Performance assessment*
- *Metrics*
- *Test and acceptance management*
- *Project document generation (paper, word processing software or web) for ICDs, Requirements Docs, etc.*



Primavera

- *Earned Value Management*
- *Integrated Master Plan/Integrated Master Schedule*
- *Software and hardware currently being installed*
- *Processes:*
 - Still working to flow-down scheduling and EVM processes and expectations from ESMD and Level II
 - ESMD CFO working closely with PP&C
 - For now
 - Use MS Project for schedule integration (Tony Beaver lead)
 - Use resource loading ONLY if it supports your needs



ICE Tools Status

- *Risk Management Tool (Active Risk Manager) – Tool Deployed*
 - Coordinating training and deployment dates with ESMD Risk Management Office
 - Version 2.08 is in work and will be deployed soon
- *Portal – Tool Deployed*
 - New features continue to be deployed.
- *Earned Value Management (Primavera) – Installation in progress.*
 - Tentatively planning to pilot with CLV in April 06. CEV scheduled as Pilot 1 in Jan 06
- *Integrated Master Plan/Schedule (Primavera) – Installation in Progress.*
 - Tentatively planning to pilot in April 06.
- *System Engineer (Cradle) – Tool Deployed*
 - New production hardware in place.
 - Working with ERTT team to determine rollout strategy and how we will rollout to projects. Delays in ERTT will impact rollout schedule.
- *Dashboard – Release 1 Basic Executive Dashboard Nov 05*
- *PLM (Windchill) – Tool Deployed*
 - Basic CM capability already in use by Constellation.
 - Phase 1 and 1A CM scheduled for mid October release with subsequent releases.
 - CM working group has been started and has CLV participation.
 - RID system being worked for Constellation. Looking at Mid Oct release.
 - Working Product structure and CAD management as well.
- *Integration Broker – Procurement in progress*
 - Application layer to facilitate contractor integration.
- *Software Management –*
 - For management and CM of the flight software.
 - Trying to determine the stake holder for this so we can start developing the requirements for this tool.
- *Business Systems –*
 - Requested as a gap filler until IEM can fill this capability.



ICE Integration Options – CEV RFP

Option 1 – Use NASA ICE as contractor work area

Option 2 – Deploy an Agent to a Single Repository of all Contractor Data

Option 3 – Integrate with ICE using an integration layer



ICE Tools Training

Current and Future ICE Training

- Current training includes:
 - Role based and application specific hands-on classroom Instructor Lead Training (ILTs)
 - WebEx virtual training
- Upcoming training classes are posted on the ESMD Calendar located on the ICE Portal
- Current training courses and class descriptions for each ICE Application are located on the ICE Portal in the portlet labeled "ICE Tip Sheets"
- Computer based training is in development and the first pilot is currently scheduled for CEV

Training Documentation

- Posted to the ICE Portal in "ICE Tips Sheets" portlet as they are developed
 - **Tip Sheets**
 - **Users Manuals**
 - **Quick Reference Cards**



Requesting ICE Training

TO REQUEST ICE TRAINING:

- Submit *ICE Training Request Form* located on the ICE Portal <https://ice.exploration.nasa.gov> in the portlet labeled “ICE Tip Sheets”
- Or submit a request to ice.admin@nasa.gov.

ICE Help Desk

1-866-419-6297

Local: 4-HELP Option “0”

*NASA Information Support Center (NISC) at
MSFC*

- Dispatch tickets to ICE Technical Support Staff
- 24/7 and 365 support



ICE FAQs

Q: *How do I get an account?*

A: *Complete electronic registration form located:*

<https://ice.exploration.nasa.gov/Windchill/netmarkets/register/register.jsp>

- Same registration page used for contractors and civil servants although different information required
- Upon submission account request routed for approval
 - Civil Servants – once confirmed account created
 - Contractors – Routed to COTR for review
- Once account is approved 2 emails will be delivered from ice.admin@hq.nasa.gov - one email with user id and a second email with password

Q: *How do I request a Windchill Project?*

A: *Submit the Windchill Project Request Form located on the ICE Portal*

<https://ice.exploration.nasa.gov> in the portlet labeled “ICE Applications”.

Q: *How do I get access to Projects if I do not know they exist?*

A: *Log onto ICE Portal <https://ice.exploration.nasa.gov/>*

- Go to portlet labeled “FAQs”
- Click on link labeled “Project Owner List”
- This link will provide a report of every Project in the Windchill system and the owner of those projects
- The user can then request access to the Project from the project owner





ICE Technical Support and Information Managers

ICE Operations Team:

- *Tools support for all ICE users*
- *Sets up new project*
- *ICE Ops Manager (and the COTR if contractor request) approve ICE account*
- *Provides ICE applications demos, training, and Helpdesk support*

Note: Users may request training directly from the ICE Operations Team via the Training Request Form located on the ICE Portal

Information Manager:

- *Project support*
- *Submits request for Windchill Project (on behalf of NASA Project Manager) via the Windchill Project Request Form located on the ICE Portal*
- *Coordinates initial training for project with ICE Operations Team via the Training Request Form located on the ICE Portal*
- *Works with NASA Project Manager to define custom project roles (contractor-specific)*
- *Creates standard folders and role set*
- *Coordinates with the NASA Project Manager to create custom sub-folders and roles*
- *Continuously reviews and maintains Project folder structure*
- *Maintains Data Access Control:*
 - *Assigns users into roles as per project access list*
 - *Coordinates access requests outside list with NASA Project Manager*
 - *Works with NASA Project Manager to assign access control to folders and documents based on team roles*
 - *Revisit Project access list/role assignments monthly*

Summary

ICE is the authoritative source of all ESMD data.

ICE compresses ESMD program/project schedules; reduces risks; reduces costs; and improves mission assurance and safety.

ICE is more than a data repository. ICE enables, supports and integrates business processes.

ICE is more than Windchill. ICE will be a set of tools integrated together and accessed through a single interface.

ICE will be the means by which contractors deliver data to the NASA.

